National Urban Policy for Australia consultation

Submission to the Australian Department of Infrastructure, Transport, Regional Development, Communication and the Arts

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Doctors for the Environment Australia

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About Doctors for the Environment Australia

Doctors for the Environment Australia (DEA) is an independent, self-funded, non-government organisation of medical doctors in all Australian states and territories.

DEA's work is based on the premise that humans need a future with clean air and water, healthy soils capable of producing nutritious food, a stable climate, and a complex, diverse and interconnected humanity whose needs are met in a sustainable way. We are therefore interested in environmental protection and restoration to promote human health and social stability.

Acknowledgement of Country

Doctors for the Environment Australia's members live and work around Australia. We would like to acknowledge Aboriginal and Torres Strait Islander peoples as the Traditional Owners of these lands, in the spirit of reconciliation.

We recognise that First Nations peoples have cared for Country and lived sustainably for millennia, and that sovereignty of this land was never ceded. We pay our respects to First Nations Elders past and present, and to emerging leaders.

Introduction

As outlined in the consultation paper, it is essential to have an overarching strategy to ensure development of urban spaces that maximize opportunities – economic, environmental and social – as well as avoid developments that do not consider the wide-ranging effects of urban environments.

Consideration of health outcomes should play a central role in this planning process as it clearly intersects with all other relevant sectors. The design of our cities is a powerful determinant of health by shaping environmental exposures and human behaviors and activities; these include heat exposure, air quality, physical activity, access to green spaces, noise, social isolation and equitable access to essential services and amenities. These are important health factors in isolation, **but** in conjunction with this, climate change is exacerbating and compounding many of these same environmental determinants of health.

Urban design challenges

Car-centric cities

To date too much urban design has centred on roads and prioritisation of motor vehicles. This increases noise and air pollution as well as reducing the walkability and general amenity of our urban areas. We need to move away from this model to one that makes healthy choices — such as walking, cycling and using public transport — easier.

Air pollution

Urban air pollution is a known carcinogen and has a range of human impacts. Those chronically exposed to traffic pollution have increased risks of asthma, respiratory infections, and even stunted lung growth in children. These health effects are caused by a mix of pollutants including fine particulate matter ($PM_{2.5}$) – tiny particles that can be inhaled and even enter the bloodstream – as well as nitrogen dioxide (NO_2).[1] Motor vehicles are a significant contributor to emissions, contributing 14% of $PM_{2.5}$, and 62%of nitrogen oxides.[2]

Recent estimates by Melbourne Climate Futures researchers shows that health impacts from vehicle emissions are likely to be far higher than previous figures informing policy decisions.[3]

Currently, Australian estimates do not factor in NO_2 gas emissions, with the result that previous figures significantly underestimate the real health impacts and no current robust estimates of vehicle-emission impacts exist to guide policy makers. Children and unborn babies are particularly vulnerable to the effects of air pollution.

Lack of physical activity

Cities that encourage car dependence force inhabitants to increase the time spent commuting — this reduces the time they are able to spend being physically active. There is extensive evidence that time spent commuting in motor vehicles is associated with obesity, with a 6% increase in obesity risk for each extra hour spent commuting.[4] As well as obesity,[5] increased commuting times increase other risk factors for the chronic diseases that are common in Australia, such as cardiovascular disease and type 2 diabetes.[6]

Flooding

The large amount of hard surfaces and reduced vegetative cover in urban areas increase surface water run-off, washing pollutants into storm water systems and waterways, increasing the risk of flooding and the impact of extreme weather in urban areas.[7] Flooding is associated with a range of health risks including contaminated floodwaters, injuries, snake and spider bites, mosquito-borne infections, mental ill-health as well as disruption to access to medicines and healthcare.[8]

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[1] Health impacts associated with traffic emissions in Australia - Expert position statement | University of Melbourne 2023

[2] Air pollution and vehicle emissions | Transport for NSW

[3] Health impacts associated with traffic emissions in Australia - Expert position statement | University of Melbourne 2023

[4] Frank LD, Andresen MA, Schmid TL. Obesity relationships with community design, physical activity, and time spent in cars. *Am J Prev Med*. 2004;27(2):87-96. https://doi.org/10.1016/j.amepre.2004.04.011

[5] Tackling Obesities: Future Choices – Obesogenic Environments – Evidence Review UK Government Office for Science 2007

[6] Hoehner CM, Barlow CE, Allen P, Schootman M. Commuting distance, cardiorespiratory fitness, and metabolic risk. *Am J Prev Med*. 2012;42(6):571-578. https://doi.org/10.1016%2Fj.amepre.2012.02.020

[7] Xu C, Rahman M, Haase D, Wu Y, Su M, Pauleit S. Surface runoff in urban areas: The role of residential cover and urban growth form. *Journal of Cleaner Production*. 2020/07/20/ 2020;262:121421. https://doi.org/10.1016/j.jclepro.2020.121421

[8] Health risks after a cyclone or flood | Health Direct 2022

Urban heat

As the impacts of climate change increase, heat is a current and emerging problem in large cities. The urban health island effect results in average temperatures sometimes 1-3°C higher those in inland rural and regional areas.[9]

Over the past 200 years, extreme heat events have caused more deaths in Australia than any other natural hazard.[10] Extreme heat harms health directly through heat stress, heat exhaustion and heat stroke.[11] However, extreme heat causes much more illness and death indirectly, through heart attacks[12] and strokes, lung and kidney disease[13] and poor birth outcomes like prematurity, low birthweight and stillbirths.[14]

While heat deaths can be difficult to quantitate, as heat is not always recorded on a death certificate, the graphic in the consultation paper is likely a significant underestimate of the true health impacts of extreme heat.

The urban heat island effect is a product of urban design and building codes, creating hot and unlivable suburbs, such as those in western Sydney and Melbourne as well as central Brisbane and its suburbs such as Jindalee and Bowen Hills. Hot suburbs are typified by inadequate green canopy, large amounts of hard surfaces, ubiquitous black roofs, inadequate shelter for those using active or public transport and insufficient neighbourhood cooler spaces.

We need innovative, nature-based solutions for cooling our cities such as well-articulated green and water spaces, channeling wind flows, greening building facades and roofs and urban forests.[15,16]

Equity

Inequitable communities enable health, wellbeing and social participation for the privileged few through unequal and unjust access to the resources, facilities and opportunities. Climate change is worsening existing inequity in cities, as those in lower socioeconomic groups are more likely to live in housing and suburbs that are less resilient to extremes of climate, have more polluted air, are less walkable and generally have lower amenity. Therefore good urban planning focused on vulnerable subpopulations is an important issue for health equity.

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[9] Climate change impacts on urban heat | AdaptNSW 2024

[10] Coates L, van Leeuwen J, Browning S, Gissing A, Bratchell J, Avci A. Heatwave fatalities in Australia, 2001–2018: An analysis of coronial records. *International Journal of Disaster Risk Reduction*. 2022;67:102671. https://doi.org/10.1016/j.ijdrr.2021.102671

[11] Leon L, Keneflick W. Chapter 12: Pathophysiology of Heat-Related Illnesses. In: Auerback P, Cushing T, Harris N, editors. Auerbach's Wilderness Medicine. Philadelphia: PA: Elsevier/Mosby, 2017. p. 249-67

[12] Sun Z, Chen C, Xu D, Li T. Effects of ambient temperature on myocardial infarction: A systematic review and meta-analysis. Environ Pollut. 2018,241:1106-14, doi:10.1016/j.envpol.2018.06.045.

[13] Ebi KL, Capon A, Berry P, et al. Hot weather and heat extremes: health risks. *Lancet*. 2021;398(10301):698-708. https://doi.org/10.1016/s0140-6736(21)01208-3

[14] Zhang Y, Yu C, Wang L. Temperature exposure during pregnancy and birth outcomes: An updated systematic review of epidemiological evidence. *Environmental Pollution*. 2017;225:700-712. https://doi.org/10.1016/j.envpol.2017.02.066

[15] Piloting Nature-based Solutions for Urban Cooling | GPSC 2022

[16] How nature-based urban solutions can help cities to stay cool: the case of Guangzhou | World Bank 2023

Solutions

DEA strongly supports the objectives of the National Urban Policy, particularly those around equity, social inclusion, safety, promoting health and wellbeing, sustainability and resilience. Clearly, these are high level objectives that require much close coordination between all levels of government, appropriate implementation funding as well as metrics and targets to measure progress[17] within and between urban areas across the nation.

Health and wellbeing must be central to sustainable, liveable cities

DEA strongly supports Objective 5 in the consultation paper: *Our urban environments and communities promote health and wellbeing*. Cities that promote health rather than illness are achieved through intersectoral approaches, including land use planning, to facilitate access to public transport, encourage active transport through measures such as green spaces and cycleways, high quality housing and access to affordable quality food.

As outlined in the National Health and Climate Strategy, a Health in All Policies approach would 'support healthy, climate-resilient and sustainable communities through whole-of-government action which recognises the relationship between health and climate actions'.[18] This would minimise missed opportunities and unintentional impacts on health and wellbeing through policies in other sectors.

As part of this, DEA recommends that Health Impact Assessments be done routinely to identify potential health costs and benefits of urban design and proposed developments. This would enable full understanding of the health and equity issues of individual projects.

A summary of the literature on the health impacts of urban planning choices was published in 2016 led by Australian professor Billie Giles-Corti and published in The Lancet.[19] DEA strongly endorses the findings of that work and recommends that those in urban planning policy are fully aware of this research.

Social infrastructure

DEA applauds the emphasis in the consultation paper on well-designed, safe social infrastructure and shared spaces that improve livability, equity, accessibility and climate resilience for all. Improved social participation and a sense of shared responsibility in urban communities are also important.

Access to safe and nutritious food

DEA supports urban planning that provides equitable access to safe, nutritious, affordable, sustainable and resilient sources of food. Sustainability can be enhanced by encouraging seasonal eating and low food miles

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[17] Measuring what matters | Treasury.gov.au

[18] National Health and Climate Strategy | Dept of Health and Aged Care 2023

[19] Giles-Corti B, Vernez-Moudon A, Reis R, et al. City planning and population health: a global challenge. *The Lancet*. 2016;388(10062):2912-2924. https://doi.org/10.1016/S0140-6736(16)30066-6

through access to farmers markets and community gardens. Community gardens also encourage social participation, physical activity, improved mental health and community resilience.[20]

Transport

Active transport

The built environment is important to increasing active transport in cities. Street connectivity and cycle paths are consistently associated with cycle behavior and therefore essential in urban planning and design.[21] Proven ways of encouraging people to choose active transport include making destinations accessible, reducing the demand for private vehicle travel (through reducing the availability and increasing the cost of parking), and designing ways to move around cities that are safe and attractive, pedestrian-friendly and cycling-friendly.[22]

We strongly support the development of mode shift targets and measurement methods for active transport, and that allocation of federal funds should be linked to achieving these targets. For instance, progress on a target for re-establishing walking to school as a community norm could be assessed by the proportion of school children who routinely walk to school, and measurement methods established for this.

New thinking and policy re-orientation is required to reflect the importance of active transport, particularly in urban areas. This includes prioritising funding active transport infrastructure over that for vehicle transport, for example, by active transport becoming an appropriately funded infrastructure role for the Commonwealth. Currently, it is much more difficult to obtain funding for building safe cycleways than motorway infrastructure, though it is a fraction of the costs. Local and state governments presently provide only small amounts of funding for active transport, but significant funds (often federal) are much more easily found for motorways.

Making active transport habitual for commuters has clear health benefits for individuals and communities. There have been two large cohort studies demonstrating substantial reductions in deaths in people who are commuter cyclists compared to people using other forms of transport. This was first shown by Andersen in Copenhagen, and repeated in the UK Biobank study for people across the UK. The 20 year follow up of the Danish cohort showed a 40% mortality risk reduction in those who cycled to work, even after adjusting for baseline leisure activity. Leisure activities such as sports were not as protective of health as commuter cycling as people are likely to stop and start sport activity, but once travel habits are established they are likely to stick.[23] The UK Biobank is a huge cohort of 263,000 people, and active transport effects were reported after 5 years of follow up. Commuter cycling showed a 46% reduction in new cases of cardiovascular disease and

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[20] Lampert T, Costa J, Santos O, Sousa J, Ribeiro T, Freire E. Evidence on the contribution of community gardens to promote physical and mental health and well-being of non-institutionalized individuals: A systematic review. *PLOS ONE*. 2021;16(8):e0255621. https://doi.org/10.1371/journal.pone.0255621

[21] Yang Y, Wu X, Zhou P, Gou Z, Lu Y. Towards a cycling-friendly city: An updated review of the associations between built environment and cycling behaviors (2007–2017). *Journal of Transport & Health*. 2019/09/01/ 2019;14:100613. https://www.sciencedirect.com/science/article/pii/S2214140519301033

[22] Giles-Corti B, Vernez-Moudon A, Reis R, et al. City planning and population health: a global challenge. *The Lancet*. 2016;388(10062):2912-2924. https://doi.org/10.1016/S0140-6736(16)30066-6

[23] Andersen LB, Schnohr P, Schroll M, Hein HO. All-Cause Mortality Associated With Physical Activity During Leisure Time, Work, Sports, and Cycling to Work. *Archives of Internal Medicine*. 2000;160(11):1621-1628. https://doi.org/10.1001/archinte.160.11.1621

commuter walking showed a 27% decrease. There were similar decreases in deaths caused by cardiovascular disease.[24]

These cohort studies are strong evidence of health benefits as the results were statistically adjusted for other explanations (confounders) such as social class and smoking which affect the studied outcomes. Notably, the 46% reduction in cardiovascular disease incidence associated with commuter cycling is a bigger benefit than any available medical intervention such as cholesterol lowering drugs, treating blood pressure or cardiac interventions.

Health benefits extend well beyond cardiovascular disease and deaths, with reductions also documented in metabolic syndrome, obesity, diabetes and hypertension, some common types of cancer incidence and depression.[25]

As well as huge health benefits, shifting 30% of urban transport onto bicycles would have social and local economic and environmental benefits such as lessening transport inequality, better air quality, reduced carbon dioxide emissions, less parking demand, protection of green space and tree canopy that would be lost to new road projects, and strategic benefits of reduced reliance on imported oil.

Shared transport

Affordable, convenient and electrified public and other shared transport is an important part of realising the health, social and environmental benefits of good urban planning and climate change mitigation.[26] Reducing the distance travelled to access public transport is an important and proven part of encouraging its use.[27] The provision of electrified public transport infrastructure enables the full benefits of reduced air pollution and greenhouse gas emissions.

Electrified transport

For maximum benefits to health, traffic congestion, air pollution and climate change mitigation, urban planning should prioritise active and shared transport. For the remaining journeys, it is important to provide sufficient incentives and infrastructure to enable a fast transition to electric vehicles.[28]

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[24] Celis-Morales CA, Lyall DM, Welsh P, et al. Association between active commuting and incident cardiovascular disease, cancer, and mortality: prospective cohort study. *BMJ*. 2017;357:j1456. https://www.bmj.com/content/bmj/357/bmj.j1456.full.pdf

[25] Qian X, Linscheid N, Tuck B, et al. *Assessing the economic impact and health effects of bicycling in Minnesota*. Center for Transportation Studies, University of Minnesota; 2016. December. Accessed July 3, 2016. https://www.cts.umn.edu/publications/report/assessing-the-economic-impact-and-health-effects-of-bicycling-in-minnesota

[26] Our plan to keep cutting climate pollution this decade: How we'll get around

[27] Giles-Corti B, Vernez-Moudon A, Reis R, et al. City planning and population health: a global challenge. *The Lancet*. 2016;388(10062):2912-2924. https://doi.org/10.1016/S0140-6736(16)30066-6

[28] Our plan to keep cutting climate pollution this decade: How we'll get around

Green spaces

It is important that urban planning should protect and substantially increase green space, to improve a wide range of aspects of livability, health, sustainability and climate change resilience,[29] especially in areas of higher urban density.

Urban green spaces can promote mental and physical health,[30,31,32] and reduce morbidity and mortality by providing psychological relaxation and stress alleviation, stimulating social cohesion, supporting physical activity, and reducing exposure to air pollutants, noise, excessive heat and flooding.[33,34]

A recent WHO report found that:

- in general, most green space types yielded positive effects on both short-term and long-term mental health outcomes.
- there were positive effects on mood for all green space types
- with few exceptions, most green space types also yielded beneficial effects on perceived stress, restorative outcomes and severity of mental disorders
- most green space types yielded positive long-term effects on overall mental health, quality of life and subjective well-being.[35]

Including space for community gardens in urban planning brings the benefits of physical and mental health and social inclusion[36] as well as contributing to the resilience of food supply.

Urban greening is also an important strategy for addressing complex global issues such as climate change, sustainable urbanisation and health inequality. This is recognised via the United Nations Sustainable Development Goal (SDG) 11 target 7, which states 'by 2030, providing universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities'.[37]

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[29] Xu C, Rahman M, Haase D, Wu Y, Su M, Pauleit S. Surface runoff in urban areas: The role of residential cover and urban growth form. *Journal of Cleaner Production*. 2020/07/20/ 2020;262:121421. https://doi.org/10.1016/j.jclepro.2020.121421

[30] Association between Urban Greenspace and Health: A Systematic Review of Literature - PMC 2021

[31] Residential green space in childhood is associated with lower risk of psychiatric disorders from adolescence into adulthood | PNAS 2019

[32] Twohig-Bennett C, Jones A. The health benefits of the great outdoors: A systematic review and meta-analysis of greenspace exposure and health outcomes. *Environmental Research*. October 2018;166:628-637. https://doi.org/10.1016/j.envres.2018.06.030

[33] Urban green spaces and health | WHO 2016

[34] Xu C, Rahman M, Haase D, Wu Y, Su M, Pauleit S. Surface runoff in urban areas: The role of residential cover and urban growth form. *Journal of Cleaner Production*. 2020/07/20/ 2020;262:121421. https://doi.org/10.1016/j.jclepro.2020.121421

[35] Green and Blue Spaces and Mental Health | WHO 2021

[36] Evidence on the contribution of community gardens to promote physical and mental health and well-being of non-institutionalized individuals: A systematic review | PLOS ONE

[37] Green space quality and health: a systematic review | International Journal of Environmental Health 2021

Urban forests

Urban forests have wide ranging health, social, environmental and economic benefits.[38]

DEA's joint report with WWF *Trees: the forgotten heroes for our health* describes the importance of trees to our health.[39] In urban areas, trees have a vital role in protecting us by providing shade and filtering polluted air. Increasing green canopy is an important part of any urban plan.

Trees lower surface and air temperatures by providing shade. Research has shown that shaded surfaces may be 11-25°C cooler than the peak temperatures of unshaded surfaces.[40] They also cool air via evapotranspiration, with the water vapour released from the leaves of trees reducing the temperature of the surrounding area. Using the sun's energy, individual trees can transpire hundreds of litres of water per day, and for every 100 litres of water transpired, trees have cooling power equivalent to the daily operation of two average household air-conditioning units.[41]

Trees are also important for protecting against ultraviolet (UV) radiation from the sun, which can cause sunburn, skin damage, eye damage and skin cancer.[42] Children are particularly at risk, with UV damage accumulated during childhood and adolescence strongly associated with an increased risk of skin cancer later in life.[43,44]

Trees can help save lives during extreme weather.[45] Research conducted during a 2017 heatwave in the western suburbs of Adelaide found that the presence of trees and grasses lowered land surface temperatures by 5-6°C compared to non-vegetated areas. The largest temperature reductions were found in suburbs further away from the coast where cooling was needed most.[46]

In the United States, living in an area well-shaded by trees has been shown to reduce the risk of heatstroke.[47] In Canada, a relationship has been seen between urban tree canopy cover and heat-related ambulance calls

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[38] 03. Benefits of Urban Forests - Tree Canada
[39] Trees: the forgotten heroes of our health | Doctors for the Environment Australia 2023
[40] Akbari H, Kurn DM, Bretz SE, Hanford JW. Peak power and cooling energy savings of shade trees. *Energy and Buildings*. January 1997;25(2):139-148. https://doi.org/10.1016/S0378-7788(96)01003-1
[41] Ellison D, Morris CE, Locatelli B, et al. Trees, forests and water: Cool insights for a hot world. *Global Environmental Change*. March 2017;43:51-61. https://doi.org/10.1016/j.gloenvcha.2017.01.002
[42] Kids Health Information : Safety: Sun protection | Royal Children's Hospital Melbourne 2019
[43] Kricker A, Armstrong BK, Goumas C, et al. Ambient UV, personal sun exposure and risk of multiple primary melanomas. *Cancer Causes Control*. 2007;18(3):295-304. https://doi.org/10.1007/s10552-006-0091-x
[44] Nasir J. Sunburn in childhood linked to melanoma. *The Lancet Oncology*. 2001;2(11):653. https://doi.org/10.1016/S1470-2045(01)00545-9
[45] Chaston TB, Broome RA, Cooper N, Duck G, Geromboux C, Guo Y, Ji F, Perkins-Kirkpatrick S, Zhang Y, Dissanayake GS, et al. Mortality Burden of Heatwaves in Sydney, Australia Is Exacerbated by the Urban Heat Island and Climate Change: Can Tree Cover Help Mitigate the Health Impacts? *Atmosphere*. 2022; 13(5):714. https://doi.org/10.3390/atmos13050714
[46] Urban trees and people's yards mitigate extreme heat in western Adelaide: final summary report — Macquarie University 2020
[47] Kilbourne EM, Choi K, Jones TS, Thacker SB. Risk Factors for Heatstroke: A Case-Control Study. *JAMA*. 1982;247(24):3332-3336. https://doi.org/10.1001/jama.1982.03320490030031

during extreme heat events.[48] Modelling of 93 European cities showed that of the 6,700 premature deaths attributed to higher temperatures in cities, one-third of these (2,644) could have been prevented by increasing urban tree cover by up to 30%.[49]

Trees also protect us from air pollution, a major contributor to ill health and premature death in Australia.[50] Trees remove fine particles of pollution from the air, which are particularly damaging as they can be inhaled deep into the lungs and cause inflammation. They also absorb gaseous pollutants such as sulphur dioxide and nitrogen dioxide, which primarily come from burning fossil fuels and motor vehicle exhausts which are strong respiratory irritants.[51] This means trees make an important contribution to the health of people, particularly those living in large cities.[52,53] In a study of the role of urban trees in addressing air pollution in 245 cities around the world, it was found that trees provided an average of 1.3 million people with a large enough reduction in fine pollution particles to generate significant health benefits.[54]

In addition, protection and restoration of urban tree canopy specifically may be a good option for promotion of community mental health.[55]

Urban biodiversity

Greening of cities is also important for enhancing biodiversity. Daily interaction with nature has positive effects on physical and psychological health, social cohesion, crime reduction, environmental awareness, and sense of belonging. Biodiversity conservation in cities helps preserve remnant natural habitats while further planning, designing, and implementing green-infrastructure networks.[56]

Building standards and housing

Building standards, especially for housing, that improve amenity, climate resilience and equity as well as protecting health are vital for our urban areas.

Housing and footprint density standards need to encourage the retention of existing vegetation and the establishment of more green and blue spaces, including green canopy and urban forests.

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[48] Graham DA, Vanos JK, Kenny NA, Brown RD. The relationship between neighbourhood tree canopy cover and heat-related ambulance calls during extreme heat events in Toronto, Canada. *Urban Forestry & Urban Greening*. December 2016;20:180-186. https://doi.org/10.1016/j.ufug.2016.08.005

[49] Lungman T, Cirach M, Marando F, et al. Cooling cities through urban green infrastructure: a health impact assessment of European cities. *The Lancet*. 2023;401(10376):577-589. https://doi.org/10.1016/S0140-6736(22)02585-5

[50] Natural environment and health - Australian Institute of Health and Welfare 2024

[51] Sulfur Dioxide Removed Annually by Tree Cover | EnviroAtlas US EPA 2020

[52] Nowak DJ, Hirabayashi S, Bodine A, Greenfield E. Tree and forest effects on air quality and human health in the United States. *Environmental Pollution*. October 2014;193:119-129. https://doi.org/10.1016/j.envpol.2014.05.028

[53] Nowak DJ, Hirabayashi S, Bodine A, Hoehn R. Modeled PM2.5 removal by trees in ten U.S. cities and associated health effects. *Environmental Pollution*. July 2013;178:395-402. https://doi.org/10.1016/j.envpol.2013.03.050

[54] A global analysis of the role of urban trees in addressing particulate matter pollution and extreme heat | The Nature Conservancy 2016

[55] Astell-Burt T, Feng X. Association of Urban Green Space With Mental Health and General Health Among Adults in Australia. *JAMA Network Open*. 2019;2(7):e198209-e198209. https://doi.org/10.1001/jamanetworkopen.2019.8209

[56] Planning for the Future of Urban Biodiversity: A Global Review of City-Scale Initiatives | BioScience | Oxford Academic

Building standards that promote thermal comfort and a high level of energy efficiency through passive design are vital to health and climate resilience. Issues that must be addressed include:

- shading, especially from greenery, where possible
- insulation, including double glazing
- colour of roofs and walls appropriate for the climate, especially to reduce heat
- ventilation that improves indoor air quality and allows buildings to cool down quickly after extreme heat
- building materials that minimise greenhouse gas emissions and are appropriate for the climate
- energy efficient heating/cooling and hot water systems
- prohibiting new gas connections — to prevent stranded assets and reduce reliance on expensive and polluting fossil fuels
- reduced reliance on the electricity grid through rooftop solar energy backed by batteries.

In addition, leadership and direction from the Commonwealth is needed on minimum standards for rental accommodation and rooming houses to protect those who have little say in their own housing conditions. Such minimum standards should cover energy efficiency, thermal comfort, safety including the phase out of gas appliances and access to renewable energy.

Power

We need to free our cities from dependence on fossil fuels to protect our health and our planet. In addition to healthy and climate resilient building design, good urban planning should include shared assets such as community power generation and batteries. These can enable more equitable access to renewable energy for those without rooftop solar and household batteries. Such distributed electricity developments should be backed up by large scale renewable power and storage from the grid.[57]

Waste

In addition to air pollution, our urban areas create enormous quantities of solid waste, much of which goes to landfill. Co-ordinated national approaches are needed to minimise waste production as well as reducing the environmental and health impacts of what waste cannot currently be avoided.

Access needs to be improved nationally to solutions that minimise the impact of food and organic waste, especially on health and greenhouse gas emissions. This is particularly important for those in medium and high density living, whose options are presently limited. Small and large scale organic composting should enable improved use of organic waste to replace synthetic fertilisers.[58]

National leadership is needed to mandate vastly improved product stewardship to reduce unnecessary waste. Manufacturers who take responsibility for the waste caused by their products are incentivised to reduce waste through improved product design, reduced use of single-use plastics and effective recycling schemes. Plastics are a particular threat to the environment through greenhouse gas emissions from their

[57] Our plan to keep cutting climate pollution this decade: How we'll power ourselves | Climate Council 2024
[58] Our plan to keep cutting climate pollution this decade: How we'll care for our land | Climate Council 2024

production, waste that does not break down and micro- and nanoplastics. Concerningly, evidence is now also emerging of the adverse effects of plastics on human health.[59,60,61]

[59] Symeonides C, Brunner M, Mulders Y, et al. Buy-now-pay-later: Hazards to human and planetary health from plastics production, use and waste. *Journal of Paediatrics and Child Health*. 2021;57(11):1795-1804. https://onlinelibrary.wiley.com/doi/abs/10.1111/jpc.15777

[60] Woodruff TJ. Health Effects of Fossil Fuel–Derived Endocrine Disruptors. *New England Journal of Medicine*. 2024;390(10):922-933. https://www.nejm.org/doi/full/10.1056/NEJMra2300476

[61] Marfella R, Prattichizzo F, Sardu C, et al. Microplastics and Nanoplastics in Atheromas and Cardiovascular Events. *New England Journal of Medicine*. 2024;390(10):900-910. https://www.nejm.org/doi/full/10.1056/NEJMoa2309822